

REMARKS

This application is believed to be in condition for allowance for the reasons described below.

Status of the Claims

Claim 9 is amended to include the features of claim 14.

Accordingly, claim 14 is cancelled.

Claims 9, 12, 16, 17, 19, 21 and 22 remain pending in the application.

Claim Rejections-35 USC §112

Claims 14 was rejected under 35 U.S.C. § 112, second graph, as being indefinite.

The features of claim 14 have been added to claim 9, and the particle features have been removed.

Therefore, the claims are believed to be definite.

Claim Rejections-35 USC §103

Claims 9, 12, 16-17, 19 21-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over MATSUMOTO et al. US 20030153223 ("MATSUMOTO") in view of NAKAZAWA JP 09-241420 ("NAKAZAWA").

Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over MATSUMOTO in view of NAKAZAWA, further in view of KOSUGA et al. US 4,960,642 ("KOSUGA").

These rejections are respectfully traversed for the reasons that follow.

Independent claims 9, 16 and 19 include a metal/plastic hybrid having 10 to 25% by weight of thermoplastic and $\geq 60\%$ by weight of (i) a metal compound melting in the range between 100°C and 400°C and (ii) copper fiber, which itself is at least 30 to 70% by weight in claims 9 and 16 and between 30 and 70% by weight in claim 19. Independent claims 9 and 19 further recite that the "copper fiber is fused with the lead-free metal compound to provide a fiber network".

Independent claim 9 now further defines the length of the copper fibers as being between 1 mm and 10mm and a thickness less than 100µm (previously presented in claim 14). Accordingly, KOSUGA will be discussed relative to the rejection of claim 9.

MATSUMOTO was offered for teaching a plastic electrical conductive material including a conductive material, a low melting point alloy and a thermoplastic matrix. The Official Action acknowledges that MATSUMOTO fails to teach the claimed low melting point compound, the amount of copper fiber and characteristics of the fiber, e.g., as recited in claims 9, 16 and 19. Indeed, while MATSUMOTO discloses metal alloys, MATSUMOTO fails to suggest "copper fiber is fused with the lead-

free metal compound to provide a fiber network", as recited in claims 9 and 19, and the specific dimensions of the fibers as recited in independent claim 9.

NAKAZAWA was offered for teaching a resin, 1-50% copper, and a low melting compound alloy. NAKAZAWA fails to suggest "copper fiber is fused with the lead-free metal compound to provide a fiber network", as recited in claims 9 and 19, and the specific dimensions of the fibers as recited in independent claim 9.

The position of the Official Action was that "it would have been obvious to one of ordinary skill in the art to use the low melting point compound of Nakazawa as the low melting point allow Matsumoto and to adjust the resin content to the desired filler in order to obtain the desired conductivity and resistivity profiles."

However, neither MATSUMOTO nor NAKAZAWA suggest a desirable conductivity or resistivity resulting from the copper fibers and low melting point metal compound being "greater than or equal to 60%", copper itself being at least 30 to 70% by weight or between 30% and 70%, and the copper fiber being fused with the lead-free metal compound.

KOSUGA is unable to remedy the shortcomings of MATSUMOTO or NAKAZAWA for reference purposes.

KOSUGA (col. 2, lines 25-33) discloses conductive fiber used in the form of a bundle of 1,000 to 10,000 fibers. This

bundle is coated with a thermoplastic resin such that the resin fills the interstices of the conductive fibers to enable the fibers to be uniformly dispersed with the resin (col. 2, lines 63-68 and column 3, lines 6-12). The amount of the resin is between 5 and 30% (col. 3, lines 42-49).

It is this uniform dispersion that is formed into pellets of 3 to 10 mm in length (col.4, lines 3-21), but there is no description of the length of the fibers *per se*. Indeed, the Examples of the KOSUGA method solely refer to lengths of the pellets, whereas the comparative examples 7-12 describe specific fiber lengths.

Thus, contrary to the position of the Official Action, KOSUGA does not disclose or suggest the same fiber length as claimed in independent claim 9.

Moreover, the structure of bundle of fibers is contrary to the teachings of the present invention. The fibers in the bundles are without any other linking metal materials between the fibers. That is, KOSUGA requires the resin fills the interstices of the fibers.

The claimed copper fibers (as recited in independent claims 9, 16 and 19) are joined or linked with a low melting lead-free alloy, i.e., "the copper fiber is fused with the lead-free metal compound to provide a fiber network". This metal compound has a melting range of 100°C to 400°C. This is contrary to a bundle of fibers uniformly dispersed within resin.

Therefore, the combination of MATSUMOTO, NAKAZAWA and KOSUGA fails render obvious claims 9, 12, 16, 17, 19, 21 and 22, and withdrawal of the rejection is respectfully requested.

Conclusion

In view of the amendment to the claim 9 and the foregoing remarks, this application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future submissions, to charge any deficiency or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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